

ANNOTATIONES ZOOLOGICAE JAPONENSES

Volume 56, No. 2—March 1983

Published by the Zoological Society of Japan

Occurrence of *Epaphiopsis* (Coleoptera, Trechinae)
in the Eastern Himalayas¹⁾

With 3 Text-figures

Shun-Ichi UÉNO

*Department of Zoology, National Science Museum (Nat. Hist.),
Shinjuku, Tokyo 160, Japan*

and

Jerzy PAWŁOWSKI

*Institute of Systematic and Experimental Zoology, Polish Academy of Sciences,
31-016 Kraków, Poland*

ABSTRACT A new subalpine species of trechine beetle is described from the eastern Himalayas under the name of *Epaphiopsis himalayica*. It is basically similar to *Epaphiama* of the southern part of the Soviet Far East and southwestern Hokkaido of Northeast Japan, but is different from the known members of that subgenus in the evolutionary trend of elytral chaetotaxy, striation, and other characters of minor importance. A new subgenus, *Allepaphiama*, is erected for the new species in view of these peculiarities.

In the autumn of 1978, Dr. Claude BESUCHET and Dr. Ivan LÖBL of the Muséum d'Histoire Naturelle, Geneva, made a collecting trip to the Darjeeling District of northeastern India. They entrusted PAWŁOWSKI with the study of their collection of Trechinae, in which were found four specimens of a peculiar species obtained in the subalpine zone of the Singalila Dara on the frontiers between East Nepal and West Bengal. At first sight, it looked like an aberrant species of the genus *Trechus*, but a closer examination revealed that it was actually a new species of *Epaphiopsis*, whose members had theretofore been known only from the Far East. This was an important discovery, since it should have furnished another proof that the trechine fauna of the eastern Himalayas has a close relationship to that of East Asia. However, we preferred postponing its proper description to the time when some additional specimens could be obtained, as the specimens then available showed individual variation on some critical points.

1) This study is supported in part by the Grants-in-aid for Overseas Scientific Survey Nos. 56041060 and 57043055 from the Ministry of Education, Science and Culture, Japan.

At last near the end of 1981, UÉNO was afforded an opportunity to visit the Singalila Dara and with the aid of the other members of the expedition, succeeded in obtaining a fairly long series of specimens of the trechine. It was clarified by the study of these specimens that though not perfectly stable, the diagnostic features of the new species were as a whole indicative of its isolated status. As was pointed out by UÉNO (1978, pp. 144–145, 1982, pp. 74–76, etc.), *Epaphiopsis* must have originated in the Chinese Continent and radiated from there. Its ancestors became differentiated into several allopatric subgenera in the Far East. With the discovery of the Himalayan representative, we became aware of the fact that the dispersal of ancestral *Epaphiopsis* had not only been effected towards the east but also towards the west, and that differentiation of lineages must have taken place according to the difference of routes of dispersal.

In the present paper, the new species will be described under the name of *Epaphiopsis himalayica*. In view of the peculiarity of the species, a new subgenus, *Allepaphiama*, will be erected for it. The abbreviations employed herein are as follows: HW—greatest width of head including eyes; PW—greatest width of pronotum; PL—length of pronotum, measured along the mid-line; PA—width of pronotal apex; PB—width of pronotal base; EW—greatest width of elytra; EL—greatest length of elytra; M—arithmetic mean; NSMT—Department of Zoology, National Science Museum (Nat. Hist.), Tokyo; MHNG—Département d'Entomologie, Muséum d'Histoire Naturelle, Genève; ISEZ—Institute of Systematic and Experimental Zoology, Polish Academy of Sciences, Kraków.

Subgenus *Allepaphiama* S. UÉNO et PAWŁOWSKI, nov.

Type-species: *Epaphiopsis himalayica* S. UÉNO et PAWŁOWSKI, sp. nov.

Basically similar to *Epaphiama* JEANNEL (1962, pp. 175, 188; UÉNO, 1978, p. 125), but more *Trechus*-like in facies, being discriminated from that subgenus mainly by the chaetotaxy and striation of elytra: stria 3 with more than three setiferous dorsal pores (at least on one elytron), stria 2 not forming an apical anastomosis with stria 3 (at least on one elytron), and apical striole either directed to stria 5 or inwardly hooked at the anterior end. Besides, the colour is dark and not depigmented, the fore body is large, not contracted, the prothorax is transverse and ample, and the pronotal hind angles are distinct though small.

Body glabrous on both the dorsal and ventral surfaces, not depigmented though devoid of inner wings; fore body large, hind body not particularly ample. Head large and transverse, with fairly large, faceted eyes and deep entire frontal furrows, the latter being somewhat angulate at middle; genae short though gently convex, perfectly glabrous; labrum widely emarginate at apex; mandibles stout, the right one being tridentate though the left is bidentate; mentum tooth fairly broad and porrect, usually a little bifid at apex, sometimes slightly emarginate or truncated; palpi short though rather thin; antennae filiform and not very long. Pronotum transverse

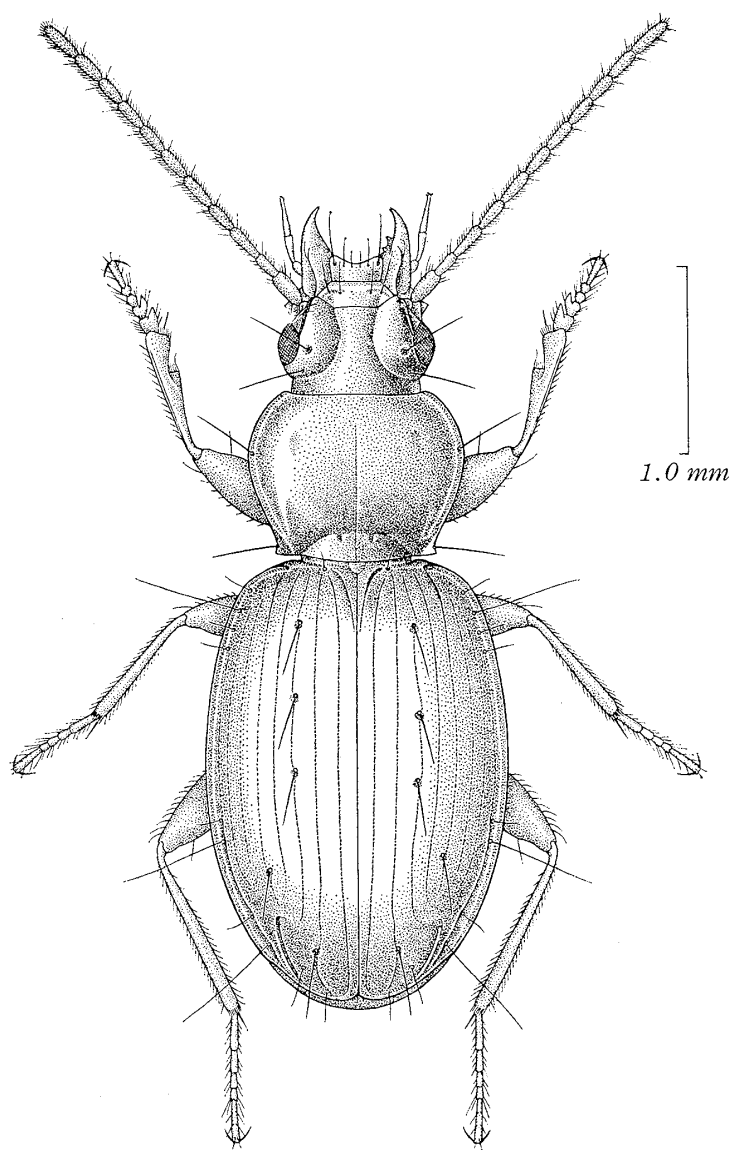


Fig. 1. *Epaphiopsis* (*Allepaphiama*) *himalayica* S. UÉNO et PAWŁOWSKI, subgen. et sp. nov., ♂, from Megma on the Singalila Dara.

subcordate and convex; sides entirely bordered, widely arcuate, and only briefly sinuate close to hind angles, which are small but distinct; lateral setae normal, the posterior one being situated near the bottom of ante-basal sinuation; postangular carinae present though obtuse.

Elytra ovate, with reflexed side borders complete to the base of stria 5; striae entire though shallower at the side than on the disc, stria 2 extending to apex usually without forming apical anastomosis with stria 3, whose apical end is usually curved outwards, either forming an anastomosis with stria 4 or even joining the hooked

terminal portion of apical striole, stria 8 deeply impressed behind the 5th pore of the marginal umbilicate series; scutellar striole fairly long; apical striole deep, only feebly curved anteriad, usually free at the anterior end though directed to stria 5, rarely joining the stria on one elytron, or inwardly hooked at the terminal portion and sometimes joining stria 3; internal series of setiferous dorsal pores composed usually of three, sometimes of four pores situated on stria 3, though the second pore is rarely missing on one elytron, external series composed of a single pore situated on stria 5 at about apical third; preapical pore situated on the apical declivity of each elytron and usually adjoining stria 2, very exceptionally situated at the apical anastomosis of striae 2 and 3 on one elytron; marginal umbilicate pores perfectly aggregated.

Ventral surface smooth; anal sexual setae normal. Legs fairly stout; protibiae straight and rather widely dilated towards apices, longitudinally grooved on the external face, and glabrous on the anterior face even at the apical part; tarsi fairly thick, segment 4 with a long ventral apophysis in pro- and mesotarsi; in ♂, two proximal segments of each protarsus widely dilated, very stoutly produced inwards at apices, and furnished beneath with adhesive appendages.

Aedeagus tubular and arcuate, not bent at the basal part, and abruptly narrowed towards apex from behind apical orifice, with very short apical lobe; sagittal aileron well developed; inner sac wholly scaly though sclerotized scales are localized; no differentiated copulatory piece; styles short, left style with a long ventral projection, each usually bearing four apical setae though the number of them is subject to individual variation.

Range. Known so far only from Tonglu and its vicinities on the Singalila Dara, on the frontiers between East Nepal and the Darjeeling District of West Bengal, eastern Himalayas.

Notes. Though greatly differing in general appearance, this new subgenus possesses most of the diagnostic characters in common with *Epaphiama*. Even the difference in the chaetotaxy and striation of elytra cannot be said perfectly decisive, because of the occurrence of such individuals as are aberrant on one side of body. Similar instability is also observed in *E. semenovi* (JEANNEL), the type-species of the latter subgenus, in which the apical striation of elytra is subject to considerable variation according to individuals (cf. UÉNO, 1978, pp. 126, 130–131). Besides, the male genitalia of *E. himalayica* are similar to those of *E. (Epaphiama) oligops* S. UÉNO of southwestern Hokkaido in Northeast Japan (cf. UÉNO, 1978, pp. 142–143, figs. 11–12). However, there is a marked discrepancy in evolutionary trend between the type-species of *Allepaphiama* and the known members of *Epaphiama*, and the distributional ranges of the two groups are separated from each other by a distance of more than 4,300 km. They should belong to different lineages and, therefore, had better be regarded as subgenerically distinctive.

Epaphiopsis (Allepaphiama) himalayica S. UÉNO et PAWŁOWSKI, sp. nov.

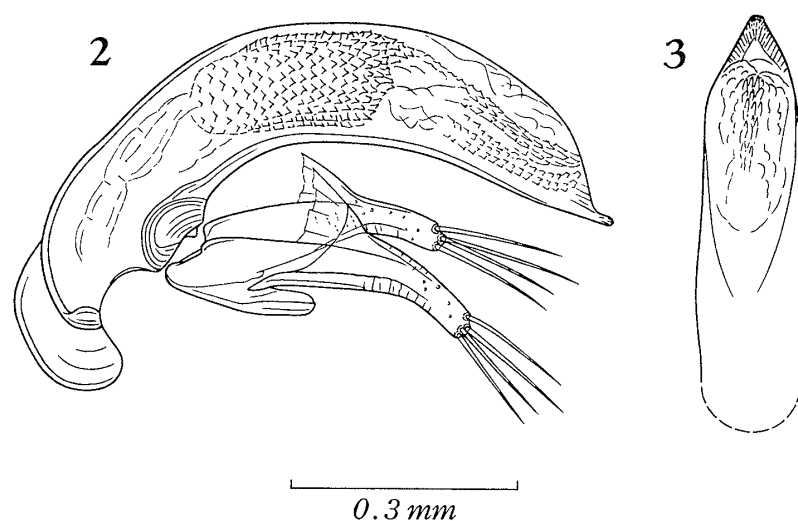
(Figs. 1–3)

Length: 3.45–3.95 mm (from apical margin of clypeus to apices of elytra).

Body rather robust, with fairly stout appendages. Colour dark brown, shiny; head except for clypeus, elytra and abdominal sternites black; antennae (segments 2–4 often infuscated), buccal appendages, lateral and sometimes also sutural margins of elytra, ventral surface of thoraces, epipleura and legs dark yellowish brown or light brown; elytra more or less iridescent.

Head large, obviously wider than long, depressed above, and with wide neck; frontal furrows deep throughout, somewhat angulate at middle, and widely divergent behind; frons and supraorbital areas moderately convex; supraorbital pores close to each other on either side, lying on lines divergent behind; microsculpture distinct, mostly consisting of wide meshes and partially (on vertex in particular) of isodiametric ones; eyes fairly large and moderately convex, though variable to some extent in both size and convexity according to individuals; genae gently convex, usually one-third as long as eyes, though the ratio of their length to that of eyes varies from two-ninths to four-ninths according to individuals; neck constriction deep and sharply marked at the sides; palpi short, with penultimate segments gently dilated towards apices; antennae reaching basal fourth of elytra (usually somewhat longer in ♂ than in ♀), segment 2 about five-sixths as long as segment 3 and slightly shorter than segment 4, segments 7–10 elongated subovate, each nearly 2.5 times as long as wide, terminal segment the longest though not much longer than scape and obviously narrower than the latter.

Pronotum transverse subcordate, much wider than head, widest at about three-fifths from base or a little behind that level, and a little more rapidly narrowed in front than behind; PW/HW 1.36–1.47 (M 1.41), PW/PL 1.27–1.41 (M 1.32), PW/PA 1.43–1.61 (M 1.52), PW/PB 1.29–1.42 (M 1.35); surface convex, with vague transverse striations and usually with a small vague depression on each side before the level of the widest part; microsculpture formed by fine transverse lines, though more or less irregular and partially obliterated; sides widely arcuate from front angles to near base, more strongly so before the widest part than behind, and very briefly but deeply sinuate just in front of hind angles, which are either rectangular or somewhat sharp and usually produced a little outwards but never backwards; apex usually a little narrower than base, PB/PA 1.01–1.19 (M 1.13), almost straight or slightly emarginate, with front angles rather widely rounded though slightly produced; base slightly arcuate at middle and slightly sinuate on each side inside hind angle; median line distinct though hardly widening in basal area; apical transverse impression either obsolete or very slight, usually somewhat uneven; basal transverse impression narrow and continuous, with a foveole on each side of median line, and laterally merging into basal foveae, which are fairly large and deep; basal area longitudinally notched along the basal margin.



Figs. 2–3. Male genitalia of *Epaphiopsis* (*Allepaphiama*) *himalayica* S. UÉNO et PAWŁOWSKI, subgen. et sp. nov., from Megma on the Singalila Dara; left lateral view (2), and apical part of aedeagus, dorso-apical view (3).

Elytra ovate, widest at about or slightly before middle, and more gradually narrowed towards bases than towards apices; EW/PW 1.31–1.43 (M 1.37), EL/EW 1.38–1.50 (M 1.46); surface convex though more or less depressed on the disc; microsculpture composed of fine transverse lines though partially obliterated; shoulders distinct, rounded, with prehumeral borders almost perpendicular to the midline at the innermost portions; sides very feebly arcuate behind shoulders, gently so behind the widest part, and rather suddenly narrowed in apical parts through slight preapical emargination; apices forming a small re-entrant angle at suture; striae superficial though entire, indistinctly crenulate, inner striae (stria 5 in particular) more or less deepening near base; intervals flat even on the disc; apical carina obtuse; setiferous dorsal pores large and somewhat foveolate, internal series usually consisting of three pores situated at $1/7$ – $1/6$, $1/4$ – $2/5$ (usually $1/3$) and $3/7$ – $5/9$ (usually $1/2$) from base respectively, a fourth pore rather frequently present at a level between $5/9$ and $3/4$ from base, external series consisting of a single pore situated at $5/9$ – $3/4$ (usually $2/3$) from base.

Legs as described under the subgenus.

Male genital organ moderately sclerotized. Aedeagus nearly one-third as long as elytra, arcuate and lightly compressed, with the dorsal margin semicircularly rounded in profile; basal part rather small, not bent, with small basal orifice, the sides of which are deeply emarginate; sagittal aileron large and elongate; apical lobe short and flattened, subtriangular with blunt extremity in dorsal view, very narrow and slightly turned up in lateral view; ventral margin widely and deeply emarginate in profile. Inner sac wholly covered with scales, but the sclerotization of them is not uniform; sclerotized scales form a narrow patch of small teeth just inside apical

orifice and a large, longitudinally rolled patch at the middle of median lobe. Styles short, with narrow apical parts, each usually bearing four apical setae though the number of them varies as many as to six on one of the styles.

Type-series. Holotype: ♂, Megma, 2,860–2,880 m alt., Singalila Dara, East Nepal, 7–XI–1981, Y. NISHIKAWA leg. (NSMT). Allotype: ♀, same locality and date, S. UÉNO leg. (NSMT). Paratypes: 5 ♂♂, 6 ♀♀, Megma, 7–XI–1981, S. UÉNO, Y. NISHIKAWA & M. SAKAI leg. (NSMT); 6 ♂♂, 2 ♀♀, Tonglu, 3,170 m alt., Singalila Dara, West Bengal, NE India, 6–XI–1981, M. SAKAI leg. (NSMT); 2 ♂♂, 2 ♀♀, Tonglu, 3,100 m alt., 16–X–1978, C. BESUCHET & I. LÖBL leg. (MHNG & ISEZ); 1 ♂, ca. 5.5 km SE of Gairibas, 2,990 m alt., Singalila Dara, West Bengal, NE India, 6–XI–1981, Y. NISHIKAWA leg. (NSMT); 1 ♂ (teneral), 1 ♀, ca. 5 km SE of Gairibas, 2,800 m alt., 3–XI–1981, S. UÉNO & Y. NISHIKAWA leg. (NSMT); 1 ♀, ca. 2.5 km SE of Gairibas, 2,880 m alt., 6–XI–1981, S. UÉNO leg. (NSMT).

Localities of the type-series. Megma (type-locality!), Tonglu, and several places between Tumling and Gairibas, 2,800–3,170 m in altitude, all on the Singalila Dara, on the frontiers between East Nepal and West Bengal, at the eastern part of the Himalayas.

Notes. Of the 29 specimens examined, 14 or 48% are more or less aberrant in the chaetotaxy of elytra. Eight (6 ♂♂, 2 ♀♀) have an additional pore on the 3rd stria of one elytron and 2 (♂♂) have the fourth pore on both the elytra, whereas in 3 other specimens (1 ♂, 2 ♀♀), the second pore of the 3rd stria is lost on one elytron. In a female paratype from Tonglu, which is heavily infected by laboulbeniaceus fungi, the second pore of the 3rd stria and the pore on the 5th stria (!) are lost on the right elytron. As was already noted in the description of the subgenus, individual variation is also frequent in the striation of the apical part of elytra.

Unlike many other species of the genus, *E. himalayica* is an inhabitant of the subalpine zone and resembles in this respect the members of the subgenus *Epaphiama*. At Megma and Tonglu, both lying on the high ridge and only 1.5 km distant from each other, the trechine lived in open meadows and were usually found from under large stones embedded in the soil. In the forested area between Tumling and Gairibas, the latter of which is about 5.6 km west-northwest of Tonglu, the trechine was much rarer than on the open ridge, having been met only sporadically from under stones or by sifting dead leaves.

ACKNOWLEDGEMENT

We wish to express our hearty thanks to Dr. Claude BESUCHET and Dr. Ivan LÖBL for the privilege of giving us the opportunity to study on this interesting species, and to Messrs. Yoshiaki NISHIKAWA and Masahiro SAKAI, who aided UÉNO in obtaining additional material in the field.

REFERENCES

- JEANNEL, R., 1962. Les Trechini de l'Extrême-Orient. *Rev. fr. Ent.*, **29**: 171–207.
- UÉNO, S.-I., 1953. Studies on the Japanese Trechinae (I) (Coleoptera, Harpalidae). *Ent. Rev. Japan, Osaka*, **6**: 30–34, pl. 7.
- 1962. Primitive trechids of the subgenus *Epaphiopsis*. *Mem. Coll. Sci. Univ. Kyoto*, (B), **29**: 41–74.
- 1978. The cryptozoic trechines of the subgenus *Epaphiama* (Coleoptera, Trechinae). *Bull. natn. Sci. Mus., Tokyo*, (A), **4**: 123–146.
- 1982. Origin and dispersal of the Trechina in East Asia (Coleoptera: Carabidae). *Ent. gen., Stuttgart*, **8**: 71–77.